CPP 程式設計題

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題目名稱(中文/英文)：Dice

主要測試觀念： Polymorphism

Basics		Functions	
☐	C++ BASICS 1	☐	SEPARATE COMPILATION AND NAMESPACES
☐	FLOW OF CONTROL	☐	STREAMS AND FILE I/O
☐	FUNCTION BASICS	☐	RECURSION
☐	PARAMETERS AND OVERLOADING	■	INHERITANCE
☐	ARRAYS	■	POLYMORPHISM AND VIRTUAL FUNCTIONS
☐	STRUCTURES AND CLASSES	☐	TEMPLATES
☐	CONSTRUCTORS AND OTHER TOOLS	☐	LINKED DATA STRUCTURES
☐	OPERATOR OVERLOADING, FRIENDS, AND REFERENCES	☐	EXCEPTION HANDLING
☐	STRINGS	☐	STANDARD TEMPLATE LIBRARY
☐	POINTERS AND DYNAMIC ARRAYS	☐	PATTERNS AND UML

題目說明：Listed below is a Dice class that simulates rolling a die with a different number of sides. The default is a standard die with six sides. The rollTwoDice function simulates rolling two dice objects and returns the sum of their values. The srand function requires including cstdlib and time.h.

```
class Dice
{
public:
  Dice();
  Dice(int numSides);
  virtual int rollDice() const;
protected:
  int numSides;
};

Dice::Dice()
{
  numSides = 6;
  srand(time(NULL));  // Seeds random number generator
}

Dice::Dice(int numSides)
{
  this->numSides = numSides;
  srand(time(NULL)); // Seeds random number generator
}

int Dice::rollDice() const
{
```

```
  return (rand() % numSides) + 1;
}

// Take two dice objects, roll them, and return the sum
int rollTwoDice(const Dice& die1, const Dice& die2)
{
  return die1.rollDice() + die2.rollDice();
}
```

Create your own class, LoadedDice, that is derived from Dice. Add a default constructor and a constructor that takes the number of sides as input. Override the rollDice function so that with a 50% chance the function returns the largest number possible(i.e. numSides) and with a 50% chance return what Dice's rollDice function returns.

Note that please use this following code snippets as your main()

```
//Main
int main()
{
    //Uncomment the line below for regular dice
    Dice die1(6), die2(6);
    LoadedDice die3(6), die4(6);

    // This would be the game; here we just simulate it rolling 10 times
    for (int i = 0; i < 10; i++)
    {
        int total = rollTwoDice(die1, die2);
        cout << total << " ";
    }
    cout << endl;

    for (int i = 0; i < 10; i++)
    {
        int total = rollTwoDice(die3, die4);
        cout << total << " ";
    }
    cout << endl;
    return 0;
}
```

輸入說明：

輸出說明：

IO 範例 ：

	Sample Input	Sample Output
第一組測資與輸出	無	隨機的 output
第二組		

附屬資料：

☑解答程式：Dice.h，Dice.cpp，main.cpp(檔名)

☑測試資料：

☐易，僅需用到基礎程式設計語法與結構

■ 中，需用到多項程式設計語法與結構

☐難，需用到多項程式結構或較為複雜之資料型態或結構

解題時間：30 分鐘。

其他註記：繳交檔案時只需繳交.h 檔，評分時會 include .h 來做批改，繳交的檔名為:學號.h。